

In conclusion, I may be permitted to express my gratification that the efforts made by Prof. Callendar and myself to demonstrate the accuracy and convenience of the methods of platinum thermometry are, although progress has been slow, at length awakening the attention of scientific inquirers. We believe (and that belief is founded not only on our own experience, but more especially on the work of Messrs. Heycock and Neville) that it is by means of the platinum thermometer that the many difficulties attendant on thermometric measurements, either at high or low temperatures, can be most easily surmounted.

Although the acquisition and installation of the apparatus has involved a considerable expenditure of both time and money, I am confident that, under the able direction of Dr. Chree, the results will justify the action of the Committee.

#### APPENDIX.

The following table gives the relation between the platinum temperature scale and the air temperature scale, when the value of  $\delta = 1.500$ .

| Platinum temperature scale. | Correc-tion. | Air tempera-ture scale. | Platinum temperature scale. | Correc-tion. | Air tempera-ture scale. |
|-----------------------------|--------------|-------------------------|-----------------------------|--------------|-------------------------|
| -100                        | + 2.9        | -97.1                   | 450                         | + 27.0       | 477.0                   |
| -50                         | + 1.1        | -48.9                   | 500                         | + 34.9       | 534.9                   |
| 0                           | 0.0          | 0                       | 550                         | + 44.0       | 594.0                   |
| 50                          | - 0.4*       | 49.6                    | 600                         | + 54.4       | 654.4                   |
| 100                         | 0.0          | 100.0                   | 650                         | + 66.2       | 716.2                   |
| 150                         | + 1.2        | 151.2                   | 700                         | + 79.4       | 779.4                   |
| 200                         | + 3.1        | 203.1                   | 750                         | + 94.2       | 844.2                   |
| 250                         | + 6.0        | 256.0                   | 800                         | + 110.7      | 910.7                   |
| 300                         | + 9.8        | 309.8                   | 900                         | + 149.4      | 1049.4                  |
| 350                         | + 14.5       | 364.5                   | 1000                        | + 197.0      | 1197.0                  |
| 400                         | + 20.2       | 420.2                   |                             |              |                         |

\* More accurately = - 0.375 and 49.625.

E. H. GRIFFITHS.

### UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

OXFORD.—It is announced that the electors to the Waynflete Professorship of Mineralogy will proceed to the election of a Professor in the course of the present year. Candidates are required to send to the Registrar of the University, on or before December 7, their applications and testimonials.

The University having accepted a bequest of £900, given by the will of the late Mrs. Fielding, for the purpose of providing for the payment of a Curator of the Fielding Herbarium, it has been decreed that there shall be a Curator of the Herbarium, appointed by the Fielding Curators, and under the direct control of the Sherardian Professor of Botany. Besides the income derived from the bequest of £900, the Curators shall have the power to apply a part of the funds at their disposal to the increase of the stipend of the Curator of the Herbarium.

The following Examiners have been approved by Convocation:—For the first examination for the degree of Bachelor of Medicine, W. R. Dunstan, G. W. S. Farmer, and Dr. R. Stockman; for the second examination for the degree of Bachelor of Medicine, Dr. C. W. Mansell Moullin, Sir William Stokes, G. E. Herman, and Dr. S. H. C. Martin. In each case the appointments are for the examinations of 1896, 1897, and 1898.

CAMBRIDGE.—Mr. T. W. Bridge, Professor of Zoology in the Mason College, Birmingham, and Mr. G. H. Bryan, F.R.S., of Peterhouse, have been approved for the degree of Doctor of Science.

Mr. C. T. R. Wilson, of Sidney Sussex College, has been elected to the Clerk Maxwell Studentship in Experimental Physics.

The late Miss Jane Saul has left her collection of shells, and the cabinet containing the same, her "Conchologia Iconica," and other conchological works, to the University.

MR. J. GAD, Extraordinary Professor of Physiology in Berlin University, has been appointed Ordinary Professor of the same subject, and Director of the Physiological Institute in the German University at Prague. Dr. M. von Lenhossek, of Wurzburg,

has been appointed Prosector in the Anatomical Institute at Tübingen. Other recent appointments are: Dr. Mark W. Harrington to be President of Washington State University; Mr. H. Landes to be Professor of Geology in the same University, and Dr. H. C. Myers to be Professor of Chemistry.

DR. C. M. LUXMORE has been appointed to a Research Fellowship of the Pharmaceutical Society.

MR. JAMES WILSON, Lecturer in Agriculture, University College, Aberystwyth, has been appointed to the Fordyce Lectureship in Agriculture in Aberdeen University.

FROM the *Journal* of the Society of Arts it appears that the great advances made by Swiss national industry during the last fifteen or sixteen years, both in the technical and artistic character of its products, are attributed by the *Deutsches Handels Archiv* to the beneficial influences of State and Municipal establishments for technical education. It is very remarkable how much is done in the cantons of Geneva and Neuchâtel to encourage and improve local industries, especially in finer classes of goods, for the manufacture of which a considerable amount of skill and artistic knowledge is required. In these two cantons, numbering little more than 220,000 inhabitants, there are five schools for watchmakers, and in Geneva, Neuchâtel, and Chaux de Fonds there are schools for instruction in the fine arts and in artistic handicrafts. Besides the institutions there are commercial schools in Geneva and Neuchâtel, and the professional schools in which instruction in various industries is given to persons of both sexes. In the watchmaking school at Geneva a class for girls has recently been established, where certain operations peculiarly suitable for female labour are taught. Considerable assistance is also rendered to the watch industry by the astronomical observatories at Geneva and Neuchâtel, both by testing chronometers, and by their co-operation in the annual trade competitions.

### SCIENTIFIC SERIALS.

*Internationales Archiv für Ethnographie*, Band viii. Heft iv.

—This well-illustrated journal is steadily increasing in value and interest, as it is wider in its scope than it was at the commencement. Baron van Hoëvell, of Amboina, has a paper on a few notes on the kinds of the worship of gods in the south-western and south-eastern islands of the Malay Archipelago. Amongst other interesting information is a legend of the origin of two fetiches which are said to have fallen from heaven; one, which is called a sword, is probably a piece of old hoop-iron, and the other, a supposed spear-point, appears to be a piece of meteoric iron. There are also traces of a virginal conception through divine influence.—"Dogs and Primitive Folk" is the title of a comprehensive essay by Dr. B. Langkavel, in which he deals with dogs in folk custom and belief, the name as a term of reproach, ornaments derived from dogs, &c.—Dr. O. Frankfurter writes on dreams and their significance according to a Siamese dream-book.—J. D. E. Schmeltz has three communications on Papuan ethnography, of which the first, on objects from the Tugeri, is the most interesting. We are now beginning to learn something definite about these ruthless pirates that harass the western coast population of British New Guinea. A bow, tobacco-pipe, drum, and two remarkable dance ornaments are figured; the latter are slabs of wood carved to represent a flying bird (?), and several lizards or crocodiles. He also describes a wood-carving of what appears to be an echidna and some ceremonial objects. The rest of the journal is occupied with the usual notes and notices.

In addition to articles specially interesting to Italian botanists, the *Nuovo Giornale Botanico Italiano* for July contains the following:—A study of the action of certain alkaloids on plants in darkness and in light, by Signor A. Maracchi. While quinine arrests the transformation of starch into saccharose, and of dextrose into levulose, both in the dark and in the light, strychnine does so only in the light, from which the conclusion is drawn that these changes are not simply chemical processes, but are dependent on other unknown forces.—On certain contrivances for dissemination in Angiosperms; in which more stress is laid than is generally the case on the action of water in the dispersion of seeds; as, for example, in the production of mucilage, to which the rupture of capsules is often due.—On the fruit of *Aucuba japonica*, by Signor L. Pampaloni.—On the affinities of the *Sphenophyllaceæ*, by Prof. G. Arcangeli. The author regards this group of fossil plants as having

no near affinity with any other, either palæontological or recent. While the structure of the stem resembles that of the *Calamariææ*, the mode of formation of the spores is analogous to that of the *Lycopodiaceæ*.—On the development of *Tricholoma terreum*, by Signor P. Voglino.

### SOCIETIES AND ACADEMIES.

#### LONDON.

**Physical Society**, November 8.—Prof. A. W. Rücker, Vice-President, in the chair.—Mr. W. H. Everett read a paper on the magnetic field of any cylindrical coil or plane circuit. The method of treatment is based on the formula for the force due to an element of current. A single integration applied to one component of this force gives for any point in the field due to a plane circuit the force perpendicular to its plane; and a double integration gives the longitudinal force at any point due to a cylindrical coil of any cross-section, the depth of winding being supposed inconsiderable. For coils in which the latter condition does not hold, an approximate solution can readily be found. The force parallel to the plane of a circuit and the transverse force due to a coil are investigated in a similar manner. The general results are of a very simple form, and admit of easy approximate calculation. Special formulæ are deduced for coils of rectangular cross-section, the general expressions being in this case integrable. Appended to the paper are some numerical results giving the values of the forces at different points due to coils of various dimensions. Prof. Perry said he considered the paper to be a valuable one, particularly as illustrating a practical mathematical method of integrating. Mr. Trotter said the paper was of interest to him, as he considered that several of the author's results might be applied to the solution of problems on illumination—for instance, the illumination of a room by a circle of lamps. Mr. Rhodes regretted that it had not been possible to supply a proof of the paper before the meeting. The method in which the author obtained the force outside a solenoid as the difference of the forces due to two solenoids, reminded him of the method employed in calculating the attraction of, say, a truncated pyramid. Prof. Silvanus Thompson said the author had mentioned several previous papers on the subject, but had not referred to one by Prof. Viriamu Jones, in which the force due to a solenoid is obtained in terms of elliptic integrals. Another method of attack was to calculate the work done when a unit pole is carried through the solenoid and back outside to the starting-point. Prof. Ayrton said he also regretted the absence of a proof of the paper. He considered it of great importance to have exact and simple methods of calculating the forces due to a solenoid. The Chairman (Prof. Rücker) said he had made a somewhat similar calculation in connection with the magnetic effect or sheets of basalt below the surface of the earth.—Mr. E. H. Griffiths read a paper, by himself and Miss Dorothy Marshall, on the latent heat of evaporation of benzene. The method employed is similar to that used by one of the authors in the determination of the latent heat evaporation of water (*Phil. Trans.* 1895). The loss of heat due to the evaporation is balanced by (a) the heat supplied by an electric current; (b) a secondary supply due to the work done by the stirrer; (c) a slight gain or loss due to small unavoidable changes in temperature of the calorimeter. The comparative values of the various sources of heat (if we denote the supply due to the electrical current by 1000) is approximately:—Electrical = 1000; stirring = 11; changes in calorimeter temperature  $\pm 5$ . The electrical supply could be measured with extreme accuracy, and the above table shows that small errors in the determination of the remaining thermal quantities are of little importance. The results may be summed up in the formula

$$L = 107 \cdot 05 - 0 \cdot 1981 \theta$$

where  $\theta$  is the temperature and the thermal unit at  $15^\circ \text{C}$ . is used. The discussion on this paper was postponed till after the reading of the paper by Prof. Ramsay and Miss Marshall, on a method of comparing the heats of evaporation of different liquids at their boiling points. The method employed has already been described before the Society (January 11, 1895). The liquid to be experimented on is put into a glass bulb enclosed in an outer jacket filled with the vapour of the same liquid. An open tube is attached to the top of the bulb, so that there is free communication between the interior and the vapour jacket, and no loss of material. Inside the bulb is a spiral of fine platinum wire, attached to stout platinum

terminals which are sealed into the glass. The temperature of the liquid in the bulb is raised to the boiling point by the vapour jacket; thus when a current is sent through the wire, the whole of the heat developed is spent in converting a portion of the liquid into vapour. Two such bulbs are connected in series, and the ratio of their losses of weight is the inverse ratio of the heats of evaporation of the liquids. A correction is made for the inequality in resistance of the spirals, and the ratio of the differences of potential between the ends of the spirals, when the current is passing, is determined in each experiment by Poggen-dorff's method. Results are given for fourteen liquids. Prof. Ramsay drew special attention to the table giving the values of the quotient  $ML/T$ , where  $M$  is the molecular weight,  $T$  the absolute temperature, and  $L$  the latent heat. Very curious differences are noticeable in the case of water, alcohol, and acetic acid. Prof. Carey Foster expressed his admiration for the method, since it obviated the necessity of knowing the specific heat of the liquid vapour. Prof. Silvanus Thompson said the difficulty experienced in the case of water due to electrolysis might be obviated by the employment of a spiral of lower resistance and a larger current, so that the difference of potential between the ends of the spiral should be less than 1.7 volts. The Chairman said Captain Abney had asked him to inquire to what extent the temperature of the liquid was affected by radiation. Mr. J. W. Rodger asked if any direct experiment had been made to determine if the temperature of the liquid was not above its true boiling point. In some cases differences of as much as  $2^\circ$  might exist between the temperature of the liquid and that of the vapour given off. The differences in the value of  $ML/T$  in the case of water, alcohol and acetic acid might be due to the fact that the vapours of alcohol and water were simple, while the vapour of acetic acid was complex. Mr. R. Appleyard suggested that the differences obtained in the case of water might be due to the presence of dissolved air. Mr. Griffiths said that the objection to the adoption of Prof. Thompson's suggestion was the fear that with short wires an excessive difference in temperature between the wire and the liquid might exist. Mr. Rhodes asked if Mr. Griffiths could trust his determinations of temperature to  $\frac{1}{100000}$ th of a degree. Mr. Griffiths, in reply, said that he thought there was no limit to the accuracy with which a difference of temperature could be measured; the absolute temperature, however, he only relied upon to  $\frac{1}{100000}$ th of a degree. Prof. Ramsay said the fact of superheating existing would not affect the results, since near the temperatures at which they were working the latent heat did not vary appreciably with the temperature. In reply to Captain Abney, he said some previous experiments by Dr. Young and himself had shown that the vapour jacket was quite impervious to radiant heat from without.

#### PARIS.

**Academy of Sciences**, November 4.—M. Marey in the chair.—Action of silicon on iron, chromium, and silver, by M. Henri Moissan. By heating silicon with soft iron, chromium, or silver in the electric furnace or otherwise, compounds having the composition  $\text{Fe}_2\text{Si}$  and  $\text{Cr}_2\text{Si}$  are produced by the two former metals, and silver dissolves a notable proportion of silicon, but deposits it again on solidification in the crystalline state. The silicides of iron and chromium are produced at temperatures below the melting points of either constituent, probably owing to the vapour tension of silicon at the temperature of formation; the whole process much resembles cementation. These silicides are readily attacked by hydrofluoric acid or aqua regia, slowly acted on by hydrochloric acid and unacted on by nitric acid. Fused potassium nitrate and chlorate do not act on these compounds, but they are easily decomposed by fusion with a mixture of nitrate and carbonate.—M. de Freycinet describes the aim of his book, "Essays on the Philosophy of the Sciences," of which a copy is presented to the Academy.—Elements of Swift's comet (1895 II), by M. L. Schulhof. These elements are compared with the elements for Lexell's comet given in Le Verrier's table (for  $\mu = +0.9$ ), and show very near agreement.—Spectroscopic researches on the star Altair. Recognition of an orbital movement and of an atmosphere, by M. H. Deslandres. (See our Astronomical Column.) On the binomial differential equation of the first order, by M. Michel Petrovitch.—New method for the extraction of roots of numbers, by M. Manuel Vazquez Prada.—Expression of the pressure supported by the shaft of a hydraulic turbine at work. Theorem concerning the dynamical effect of the water. Note by M. Bertrand de Fontviolant. It is concluded that: The